



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Four hundred and thirty-first meeting.

October 14, 1856. — MONTHLY MEETING.

The PRESIDENT in the chair.

Dr. C. T. Jackson, from the committee appointed at the last preceding meeting to consider the propriety and practicability of removing Dighton Rock, read a letter from Dr. Hamlin of Maine, describing the present situation of this interesting antiquity, and giving urgent reasons for its removal, in order to the preservation of the inscription, which, it appears, is in such a position that it cannot well be photographed as it lies.

President Hitchcock joined in the recommendation, and gave some details respecting the position and nature of the rock, and the condition of the inscription, which, he argued, is likely soon to be obliterated, unless removed from its present situation.

Dr. O. W. Holmes exhibited a suite of Indian arrow-heads, or, most likely, spear-heads, found in the soil of his grounds at Pittsfield, arranged in a series so as to show all the stages of manufacture, from the natural piece of hornstone, slightly hammered, to the finished implement.

Dr. A. A. Hayes made the following communication : —

“ On the Change of Position among the Particles of Solid Metals, induced by the Action of Gentle but Continued Percussion of the Masses they form. ”

“ In calling the attention of the members to this subject, I will state that the chief illustration of some new points is to be found in the specimens exhibited ; which show the gradation of action, dependent on time elapsing while the masses were exposed, in a distinct manner.

“ The change by which malleable iron becomes converted into a highly crystalline metal, when subjected to pressure attended by a tremulous motion, as in the case of railway bars, has been often observed, and the attendant circumstances noted. My attention has been called to many cases, in which the same effects have followed

a gentle percussive action on a part of a bar, the metal becoming changed at one point only, and hence — by chemical dissection the bar being laid open — the fibrous metal could be seen united to that changed portion, which had become highly crystalline and generally brittle.

“It is well known that the crystalline condition, assumed after the iron has been laminated to the extent of rendering it uniformly fibrous, is due to motion and change of place between the molecules of the iron, without the condition of softening or fluidity. The extreme cases often present us with a polarized condition, in which the crystallized iron is as perfect indeed as would have resulted from cooling a fluid mass in a state of repose.

“Malleable iron in its fibrous arrangement may be assumed as exhibiting its particles of broken-down crystals in a state of tension, in which certain physical conditions, such as specific gravity and resistance to strain, are insured while this state continues. A return to the normal or crystalline state requires only vibratory motion, in aid of natural polarizing forces always acting, to cause molecules to unite into regular solids and pass to a condition of repose, in which the masses become brittle. It is among the triumphs of modern science that a successful effort has been made to overcome the practical disadvantages arising from this disposition in malleable iron to become brittle; and in one of its most important applications — that of railway axles — this has been effected completely. The discovery by E. M. Connell, an English engineer, that the vibrations among the particles of *hollow masses* do not result in crystalline arrangements, has led to the adoption of hollow axles, in which uniformity of thickness of metal is insured, while only two thirds of the weight of the metal used for forming a solid axle is retained.

“An interesting case of the formation of large crystals under quite new conditions, in an alloy of which zinc forms the larger part, has recently been observed by me. This alloy, when rapidly cooled, presents a crystalline arrangement much like that of steel. When cast in the form of balls, in cold metallic moulds, it shows the effect of *chilling* remarkably. The metal forming the exterior becomes solid and more dense, while that in the interior conforming to it leaves a void of a spherical form, in each ball of an inch in diameter as large as a small pea. From well-known facts, we should have expected to find this cavity bounded by crystals or crystalline facets; which does

not occur, but its inner surface always exhibits the flaws and irregularities observed when a metallic mass contracts in cooling from a fluid state. These balls were used for reducing saline bodies to powder in revolving cylinders containing several hundreds of them, and the conditions were such that the balls, impinging on each other at mere points as it were, received light blows over every part of their surfaces. It would perhaps be inferred that the diameters would have been reduced by the metal being forced into the void space as the effect of percussion. Instead of this reduction, the balls first became elongated pear-shaped, they then exhibited protuberances, and finally an elongated mammillary form, in which the diameter was one half longer than that of the original, while the whole bulk was increased from one to one and twenty-four hundredths.

“A careful examination of the surfaces showed that the uniformity of the indentations from impinging was constant, and the conclusion was, that the new forms assumed were in no wise affected by any inequality of this action.

“On breaking the specimens, the internal structure of each ball was nearly the same, *exhibiting an effort to form prismatic crystals radiating from a centre on one side of the void, while every particle seemed to have changed its place and made a new aggregation.* Where before the texture was small-granular, broad and brilliant-bladed crystals were found, with open interstices, while in the space originally void the terminal points of many crystals made it a geode in appearance.

“In offering an explanation of this extensive change among the molecules, I think we may consider the polarized state of the outer surface of the ball suddenly cooled as continuous in its action. The attraction of the interior molecules for this part is seen in the formation of a void space; and when the vibrations of impinging points induced a movement, the molecules united their dissimilar poles in the ordinary way of building up a crystalline aggregate. The natural crystal of this alloy being prismatic, room for the radiations which this form must exhibit would be found only by an enlargement of the exterior crust, which, owing to the slight degree of malleability in this case, occurred without fracture. Unequal aggregation of crystals formed would produce the concretionary and mammillary masses into which the balls were converted; and it seems probable that the taking on of this form was but one step in passing to one still more simple, in

which the natural crystalline form of the alloy would have been presented in a single crystal."

Dr. Engelmann gave additional accounts of the peculiarities, classification, and geographical distribution of the *Cactaceæ* of the United States.

President Hitchcock exhibited a model representing the shape of the masses of snow which fell at Brattleborough, Vermont, on the 24th of May last. The masses were all alike, and in the form of a cone with a concave base, of about a quarter of an inch in diameter, and of a pretty firm consistence, — about that of an ordinary snow-ball.

Four hundred and thirty-second meeting.

November 12, 1856. — QUARTERLY MEETING.

The PRESIDENT in the chair.

Professor Agassiz stated that he had recently been engaged in the study of a number of fishes of Greece, which he had received from his friend, Dr. Roeser, through the agency of Professor Felton, which led him to identify the Glanis of Aristotle.

"There are several classes of the animal kingdom, respecting the habits of which most of the information stored up in our scientific records is derived from the observation of men of little education engaged in the labors of common life. This is particularly the case with the fishes. The importance of fisheries at all times, and the value of fish as an article of food, have made it necessary for those interested to ascertain all that can be known respecting the habits of fishes, in order that they may the more successfully pursue their occupations. If we look over all the works on ichthyology written down to the present day, or any more general works in which the fishes are included, a critical reader will very soon perceive that the remarks relating to the habits of fishes are for the most part made on the authority of the fishermen. Cuvier justly says, that to his day no man knew the fishes of the Mediterranean more accurately than Rondelet, — that classic sea, surrounded from the most ancient times by civilized nations interested in fisheries, fond of fish as an article of